

GAN Scenarios at BNL: RHIC, LHC, SNS

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- **“Local” RHIC Operations/Experiment Scenarios**
 - Integrate RHIC ops, experiments, outlying support buildings
 - Near-term start time: 2–4 months
- **LHC/RHIC Instrumentation Collaboration Scenarios**
 - CERN remote studies of test LHC instrumentation in RHIC
 - Medium-term start time: 4–18 months
- **SNS Startup Scenarios**
 - Remote diagnosis and commissioning of SNS ring
 - Long-term start time: 1–3 years
- **Observations**
 - Collaborative tools are essential for all three scenarios
 - Short-term more social, longer-term more technical
 - Each scenario naturally builds on previous scenarios
 - “Simple” collaborative tools like electronic logs \Rightarrow long latencies

RHIC Operations/Experiment Integration

- **Improve communication efficiency in RHIC operations**
 - Main control, four experiments, instrumentation and RF buildings
 - Broadcast web screens, elog, voice annunciators in place
 - Average shift includes 16–18 shift workers at 6 locations
 - Minimize inherent inefficiencies of second-hand information
 - Allow remote observation of shift change meetings
- **Mini-scenario 1: Dumping collider store**
 - MCR: Actively notify all locations to coordinate dump time
 - Inquisitive phone calls from experiments are distractions
 - Experiments want ways to passively know when setup problems occur
- **Mini-scenario 2: Beam study periods**
 - Often need to compare/discuss screens/scopes from several locations
 - Currently place copies in elog (when possible) and discuss over phone
 - Desire continuous background voice connections with remote locations

LHC Instrumentation Collaboration

- **Testing LHC instrumentation in RHIC during beam studies**
 - Scheduled study times but ad-hoc visual/data-intensive meetings
 - Controlled secure narrow/deep controls access by CERN personnel
 - Limited collaborative environment training required
 - Shared data files, analysis codes and displays⇒ A secure interlab extension of p. 2, mini-scenario 2
- **Instrumentation tests routinely push boundaries of accelerators**
 - Objectives of studies are often improvisational during learning
 - Just-in-time analysis: integration of many different data sources
 - But often moves to “take data now, analyze later” approach⇒ Ranges from very improvisational to very procedural
- **Mini-scenario 1: Phaselock loop tunemeter commissioning**
 - Shared DSP/analysis software development; all software located at BNL
 - Access to system setup and data shared by BNL/CERN personnel
 - Read-only, stripchart access to other relevant instrumentation
 - Hardware duplication between sites: test at CERN, test/live at BNL

SNS Startup and Ring Commissioning

- **BNL experts responsible for SNS ring design, instrumentation**
 - Experts may be 24/7 on-call, requiring access when granted
 - Extensive collaborative environment training required
 - Controlled secure broad/deep controls access by BNL personnel
- **Mini-scenario 1: Power supply hardware examination/diagnosis**
 - Requires coordination of on-site and off-site engineers
 - “Shoulder-riding” telepresence, bidirectional audio
 - Perhaps a necessary scenario for responsibility transfer
- **Mini-scenario 2: Shared-site commissioning**
 - Transfer of facility controls between labs for commissioning
 - Still requires site support and supervision
 - Potentially includes all aspects of remote operations

One last social engineering thought...

- How do we share champagne between distant control rooms?